

BH1H Killer Ant Guitar Amplifier Head

User's Guide



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WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE. TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



PRECAUCION: PARA REDUCIR EL RIESGO DE INCENDIOS O DESCARGAS ELECTRICAS, NO PERMITA QUE ESTE APARATO QUESE EXPOSTO A LA LLUVIA O LA HUMEDAD. PARA DISMINUIR EL RIESGO DE CORRIENTAZO, NO ABRA LA CUBIERTA. NO HAY PIEZAS ADENTRO QUE EL USUARIO PUEDE REPARAR DE JE TODO MANTENIMIENTO A LOS TECNICOS CALIFICADOS.



ATTENTION: PROTEGEZ CET APPAREIL DE LA PLUIE ET DE L'HUMIDITE AFIN EVITER TOUT RISQUE D'INCENDIE OU D'ELECTROCUTION. POUR REDUIRE D'ELECTROCUTION NE PAS ENLEVER LE COUVERCLE. AUCUNE PIECE INTERNE N'EST REPARABLE PAR L'UTILISATEUR. POUR TOUTE REPARATION, S'ADRESSEZ A UN TECHNICIEN QUALIFIE.

IMPORTANT SAFETY INSTRUCTIONS

- READ, FOLLOW, HEED, AND KEEP ALL INSTRUCTIONS AND WARNINGS.
- DO NOT OPERATE NEAR ANY HEAT SOURCE AND DO NOT BLOCK ANY VENTILATION OPENINGS ON THIS APPARATUS. FOR PROPER OPERATION, THIS UNIT REQUIRES 3" (75mm) OF WELL VENTILATED SPACE AROUND HEATSINKS AND OTHER AIR FLOW PROVISIONS IN THE CABINET.
- DO NOT USE THIS APPARATUS NEAR SPLASHING, FALLING, SPRAYING, OR STANDING LIQUIDS.
- CLEAN ONLY WITH LINT-FREE DRY CLOTH AND DO NOT USE CLEANING AGENTS.
- ONLY CONNECT POWER CORD TO A POLARIZED, SAFETY GROUNDED OUTLET WIRED TO CURRENT ELECTRICAL CODES AND COMPATIBLE WITH VOLTAGE, POWER, AND FREQUENCY REQUIREMENTS STATED ON THE REAR PANEL OF THE APPARATUS.
- WHERE THE MAINS PLUG OR AN APPLIANCE COUPLER IS USED AS THE DISCONNECT DEVICE, THE DISCONNECT DEVICE SHALL REMAIN READILY OPERABLE.
- PROTECT THE POWER CORD FROM DAMAGE DUE TO BEING WALKED ON, PINCHED, OR STRAINED.
- UNPLUG THE APPARATUS DURING LIGHTNING STORMS OR WHEN UNUSED FOR LONG PERIODS OF TIME.
- ONLY USE ATTACHMENTS, ACCESSORIES, STANDS, OR BRACKETS SPECIFIED BY THE MANUFACTURER FOR SAFE OPERATION AND TO AVOID INJURY.
- WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK OR FIRE, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.
- SERVICE MUST BE PERFORMED BY QUALIFIED PERSONNEL.
- OUR AMPLIFIERS ARE CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS. CONTINUED EXPOSURE TO HIGH SOUND PRESSURE LEVELS CAN CAUSE PERMANENT HEARING IMPAIRMENT OR LOSS. USER CAUTION IS ADVISED AND EAR PROTECTION IS RECOMMENDED IF UNIT IS OPERATED AT HIGH VOLUME.
- WARNING: THIS UNIT REQUIRES A SAFETY GROUNDED OUTLET WIRED TO CURRENT ELECTRIC CODES HAVING THE LINE SUPPLY VOLTAGE, POWER, AND FREQUENCY IDENTIFIED ON THE REAR OF THE UNIT. THE OUTLET MUST REMAIN ACCESSIBLE TO DISCONNECT THE UNIT IF A FAULT SHOULD ARISE WHILE IN USE. THIS UNIT SHOULD BE UNPLUGGED WHEN NOT IN USE.

EXPLANATION OF GRAPHICAL SYMBOLS:

EXPLICACION DE SIMBOLOS GRAFICOS:

EXPLICATION DES SYMBOLES GRAPHIQUES:



= "DANGEROUS VOLTAGE"
"VOLTAJE PELIGROSO"



"IT IS NECESSARY FOR THE USER TO REFER TO THE INSTRUCTION MANUAL"
"ES NECESARIO QUE EL USUARIO SE REFIERA AL MANUAL DE INSTRUCCIONES"
"REFERREZ-VOUS AU MANUAL D'UTILISATION"



Correct disposal of this product: This symbol indicates that this product should not be disposed of with your household waste, according to the WEEE directive (2002/96/EC) and your national law. This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, or your household waste disposal service.



Introduction

Congratulations! What do you do when a whole watt of sweet, responsive, single-ended, Class-A goodness is just too much power? You turn to your trusty Blackheart Engineering tone junkies of course. The result is our BH1H Killer Ant, a fractional watt, all-tube guitar amp that takes the tone of BHE's not-quite-legendary-but-getting-there Hothead's "Loud" channel, and packs it up nice and neat under manageable volumes for recording and where small space might otherwise sacrifice tone.

Under the hood is a clever little power block designed by none other than the Daddy of boutique amp tone, Pyotr Belov. After you're done staring at its unusually impressive build quality, showing your buddies how it fits in the palm of your hand, and after you've stuck your complimentary Blackheart stickers on your guitar case, plug it in and enjoy how a great tube amp sounds. Pluck out a few chimey riffs and then dig in nice and hard so it breaks up and growls at you a bit. That's a real amp you're playing there friend. While you're at it, plug it into your favorite 4 x 12 cab. Oh yeah, the Ant can push your best effort through just about anything you plug it into. Don't let the size fool you.

And how about that build quality? Just like all Blackheart Engineering gear, the Killer Ant is a thing of beauty inside and out. 16 gauge steel, 1/2" radius corners, double-sided PCB with big, thick, 2 oz. copper traces to keep your tone nice and fat all the way through to the speaker....you name it, we're doing it right. That's because you took the time to find us, to make us the official supplier of your personal quest for the best tone. There's no way we're lettin' you down. As always, you put your hard-earned cash on the table to get a piece of Blackheart gear and we take that as a very personal thing. We're in it for the long haul, just like you.

Vous avez notre coeur,

Pyotr Belov

Kevin Van Pamel

Walter Hsu

Blackheart Engineering



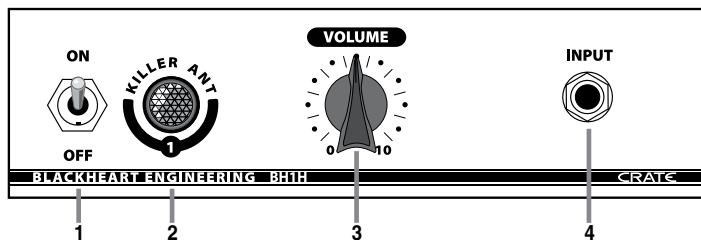
BH1H Special Features:

- Single-ended Class A circuit
- All tube signal path
- Two 12AX7/ECC83 power preamp and power amp tubes
- DC filament power supply for all tubes
- Volume Control (the rest is up to you)
- 16-gauge (1.5 mm) thick, folded U channel steel chassis
- Double-sided custom color PCB with 2 oz. copper traces
- 15-ply, 18 mm thick, void-free birch plywood construction
- 16 ohm, 8 ohm, and 4 ohm speaker outputs
- Lovely red **on** light





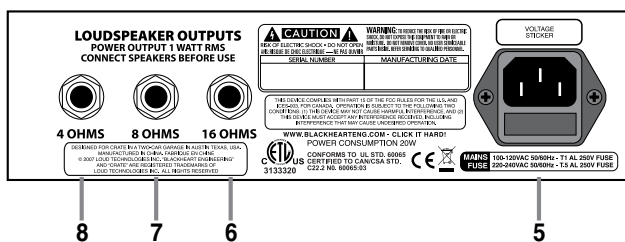
The Front Panel



1. **ON/OFF SWITCH:** Use this switch to turn the amplifier on and off.
2. **INDICATOR LAMP:** This illuminates when the amplifier is turned on (power, that is).
3. **VOLUME:** Use this to adjust the output level.
4. **INPUT:** Use this jack to connect your guitar to the amplifier using a high-quality shielded instrument cable.



The Rear Panel



The rear panel has connections for the AC power cord and external speaker cabinets.

WARNING! Never turn on or use the amplifier without a load or speaker connected to the amplifier.

5. AC Power Input with Mains Fuse:

Your amplifier is equipped with a detachable power cable that plugs into the IEC Mains socket on the back of the amplifier. The AC power cord should only be plugged into a grounded power outlet that meets all applicable electrical codes and is compatible with the voltage, power, and frequency requirements stated on the rear panel of the amplifier. Do not attempt to defeat the safety ground connection. The AC Mains fuse is located in the IEC Mains socket and is used to protect the amplifier from electrical faults. If the fuse needs to be replaced, please refer to the correct fuse specifications located on the back panel of the amplifier. Always unplug the power cord when changing or inspecting the fuse. Never bypass the fuse or replace it with a wrong type or value.

6. **16 OHMS:** The 16 ohm speaker output jack is designated for 16 ohm speaker cabinets only, such as the Blackheart BH110, BH112, BH412SL or BH412ST.

7. **8 OHMS:** The 8 ohm speaker output jack is designated for use with one 8 ohm speaker cabinet, or two 16 ohm cabinets that are connected parallel.

8. **4 OHMS:** The 4 ohms speaker output jack is designated for use with one 4 ohm speaker cabinet, or two 8 ohm cabinets that are connected parallel.

Connecting speaker cabinets

The hookup diagrams on the next page show some different cabinets, their impedance, where to plug them in, and the total load impedance placed on the amplifier.

ALWAYS use good quality (non-shielded) speaker cable to connect speaker cabinets. Never use (shielded) instrument cable.

ALWAYS match the amplifier's speaker output impedance to the impedance of the speaker that is being used.

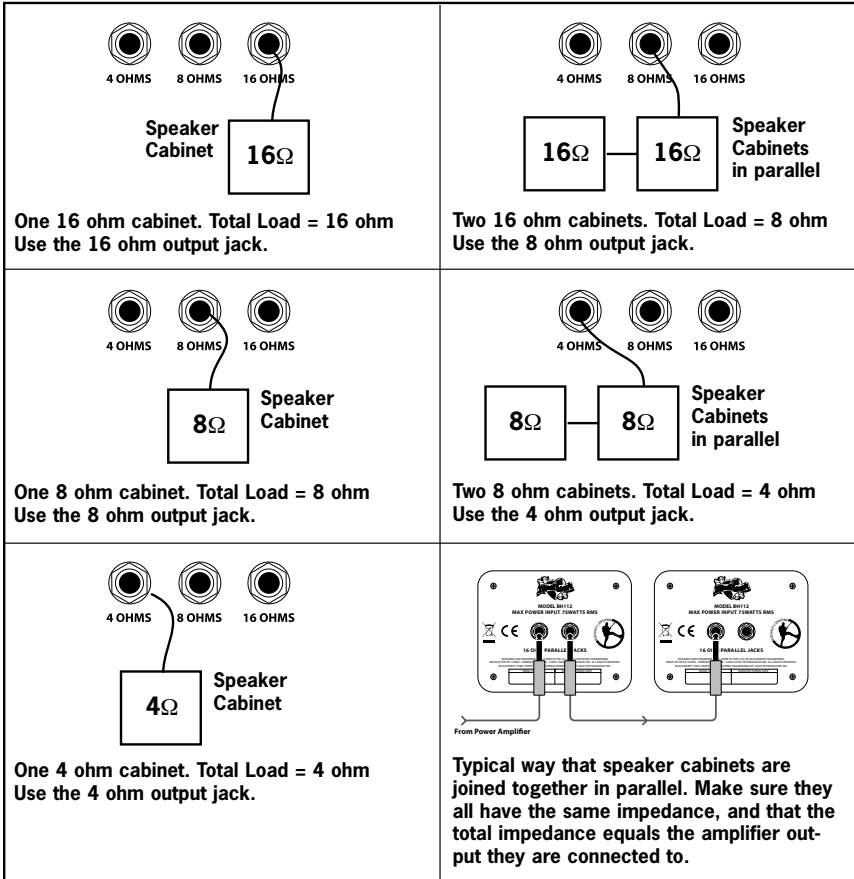
- Use only one output at a time.
- If more than one speaker is connected together in parallel, make sure they all have the same impedance rating.
- When using multiple speaker cabinets (with the same impedance rating), match the total load impedance of the speaker cabinets to the speaker output of the amplifier.

For equal-impedance speakers connected in parallel, the first law of rock and roll states:

$$\text{SPEAKER CABINET IMPEDANCE divided by NUMBER OF CABINETS} = \text{TOTAL LOAD}$$



Typical connections to speaker cabinets





Important Information about Tubes and Tube Products:

The Nature Of Tubes — Why (And When) To Replace Them:

Tubes are made up of a number of fragile mechanical components that are vacuum-sealed in a glass envelope or bubble. The tube's longevity is based on a number of factors which include how hard and often the amplifier is played, vibration from the speakers, road travel, repeated set up and tear down, etc.

Any time you notice a change in your amplifier's performance, check the tubes first.

If it's been a while since the tubes were replaced and the sound from your amplifier lacks punch, fades in and out, loses highs or lows or produces unusual sounds, the power tubes probably need to be replaced. If your amplifier squeals, makes noise, loses gain, starts to hum, lacks "sensitivity", or feels as if it is working against you, the preamplifier tubes may need to be replaced.

The power tubes are subjected to considerably more stress than the preamplifier tubes. Consequently, they almost always fail/degrade first. If deteriorating power tubes aren't replaced they will ultimately fail. Depending on the failure mode, they may even cause severe damage to the audio output transformer and/or other components in the amplifier. Replacing the tubes before they fail completely has the potential to save you time, money and unwanted trouble. Since power tubes work together in an amplifier, it is crucial that they (if there is more than one) be replaced by a matched set. If you're on the road a lot, we recommend that you carry a spare matched set of replacement power tubes and their associated driver tubes.

After turning off the power and disconnecting the amplifier from the power source, carefully check the tubes (in bright light) for cracks or white spots inside the glass or any other apparent damage. Then, with the power on, view the tubes in a dark room. Look for preamplifier tubes that do not glow at all or power tubes that glow excessively red.

Whenever you replace the power tube(s):

- Always have the amplifier's bias voltage checked by a qualified service center. Improper bias voltage will cause degradation in performance and possibly damage the tubes and/or the amplifier. (See "The Importance of Proper Biasing", below for more information).
- We highly recommend that you replace the driver tube(s) as well. The driver tube determines the shape and amplitude of the signal applied to the power tube(s) and has to work almost as hard as the power tube(s).

You can check your preamplifier tubes for microphonics by turning the amplifier on, turning up the gain and tapping lightly on each tube with the end of a pencil or a chop stick (my favorite). You will be able to hear the tapping through your speakers, which is normal. It is not normal for a tube to ring like a bell after it's tapped. If it does ring then it's microphonic and should be replaced. Remember to use only high quality, low microphonic tubes in the preamplifier section.

Even though power tubes are rarely microphonic, you should check them anyway. The power tubes can be checked for microphonics just like pre-amp tubes.

In the case of very high gain amps, you may be able to reduce the amount of noise generated by simply swapping the preamp tubes around.



Important Information About Tubes and Tube Products (continued):

The Importance Of Proper Biasing:

For the best performance and longest tube life, proper biasing is imperative. Bias is the negative voltage which is applied to the power tube's control grid to set the level of idle current. We cannot over emphasize the difference in warmth of tone and dynamic response that come with proper biasing. If the bias is set too high (over biased), the sound from the amp will be distorted at all levels. If the bias is set too low, (under biased) the power tubes will run hot (the plates inside the tubes may glow red due to excessive heat) and the sound from the amplifier will lack power and punch. The excessive heat greatly reduces tube life – from a few days to as little as a few hours in extreme cases. Setting the bias on your amp is like setting the idle on your car. If it's too high or hot it's running away with you and if it's too low or cold it will choke when you step on it.

The bias is adjusted at the factory in accordance with the type of power tube(s) installed in your amplifier. It is important to point out that tubes of the same type and specification typically exhibit different performance characteristics. Consequently, whenever power tubes are replaced, the bias voltage must be checked (unless the amplifier is equipped with "self-biasing" circuitry) and readjusted to accommodate the operating parameters of the replacement tubes.

Depending on the model and amplifier type, there may be hum balance controls, trim pots, or bias adjustment controls on its rear panel. However, the bias adjustment should be performed only by qualified service personnel with the proper, calibrated test equipment.



Important Information About Tubes and Tube Products (continued):

Survival Tips For Tube Amplifiers:

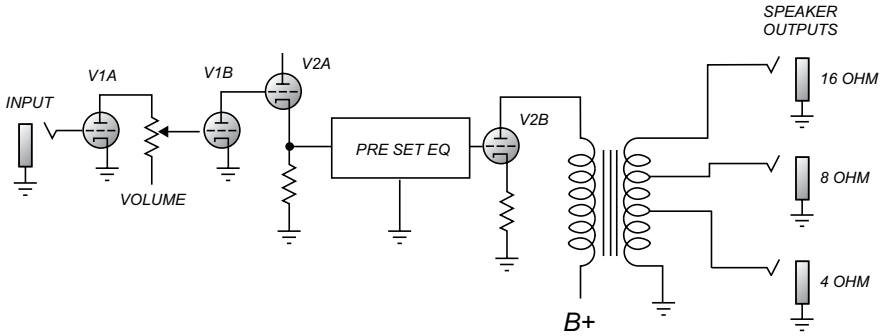
To prolong tube life, observe these tips and recommendations:

- Match the impedance of your speaker cabinet(s) to your amplifier. Improper impedance matching will contribute to early tube degradation and may cause premature tube failure.
- Make sure the speaker(s) are properly connected prior to turning on the amplifier.
- After playing the amplifier, allow sufficient time for it to properly cool down prior to moving it. A properly cooled amplifier prolongs tube life due to the internal components being less susceptible to the damage caused by vibration.
- Allow the amplifier to warm up to room temperature before turning it on. The heat generated by the tube elements can crack a cold glass housing.
- Replace the output tube(s) before the performance degrades or the tubes fail completely. Replace the tube(s) on a regular basis (at least once per year or as often as every 4 to 6 months if you play long and hard every day).
- Always have the bias checked after replacing the output tubes (unless the amplifier is equipped with “self-biasing circuitry”). This should be done **ONLY** at a qualified service center. Improper biasing could result in the tubes running too hot, which greatly reduces the life of the tubes – or too cold, which results in distorted sound regardless of level settings. Do not play the amplifier if it exhibits these symptoms – get the bias checked/adjusted immediately to prevent tube failure and/or other damage.
- If the locating notch on the base of a power tube breaks off, replace the tube. This significantly reduces the risk of damaging your amplifier by incorrectly inserting the tube.
- Protect the amplifier from dust and moisture. If liquid gets into the amplifier proper, or if the amplifier is dropped or otherwise mechanically abused, have it checked out at an authorized service center before using it.
- Proper maintenance and cleaning in combination with routine checkups by your authorized service center will insure the best performance and longest life from your amplifier.

CAUTION: Tube replacement should be performed only by qualified service personnel who are familiar with the dangers of hazardous voltages that are typically present in tube circuitry.



System Block Diagram



Declaration Of Conformity

Manufacturer:	LOUD Technologies Inc. 16220 Wood-Red Rd. NE Woodinville, WA 98072, USA
Product Name:	Blackheart BH1H
Product Type:	Audio Amplifier
Complies with Standards:	
LVD:	92/31/EEC, 93/68/EEC, & 73/23/EWG
Safety:	EN60065
EMC:	EN55013, EN55020, EN55022, EN55103, EN61000-3-2, & EN61000-3-3

The official Declaration of Conformity for this product is kept on file at:
LOUD Technologies Inc., 16220 Wood-Red Road NE, Woodinville, WA 98072 • Tel: 1-866-858-5832



BH1H TECHNICAL SPECIFICATIONS

Output Power Rating	.25 W RMS, 16 ohm load
Signal-to-Noise Ratio	63 dB, Typical
Input Impedance	1 Meg Ohm
Preamp Tubes	1.5 of 12AX7/ECC83
Power Tubes	0.5 of 12AX7/ECC83
Rectifier	Solid State
Speaker Outputs	1 x 16 ohms, 1 x 8 ohms, 1 x 4 ohms
Power Requirements	110/120 VAC, 50/60 Hz, 20 W 220/240 VAC, 50/60 Hz, 20 W
AC Mains Fuse	100/120 VAC: T2.AL 250V Fuse 220/240 VAC: T1.AL 250V Fuse
Size (H x W x D)	7.9 in/200 mm (including feet) x 9.85 in/250 mm x 7.28 in/185 mm
Weight	12.1 lb/5.5 kg

The Blackheart BH1H Killer Ant is covered with a durable fabric-backed vinyl material. Wipe it clean with a lint-free cloth. Never spray cleaning agents onto the cabinet. Avoid abrasive cleansers which would damage the finish. Never spray your Killer Ant with Ant Killer.

Crate continually develops new products, as well as improves existing ones. For this reason, the specifications and information in this manual are subject to change without notice.

"Blackheart" and "Crate" are registered trademarks of LOUD Technologies Inc. All other brand names mentioned are trademarks or registered trademarks of their respective holders and are hereby acknowledged.

Service Information

If you are having a problem with your Blackheart BH1H Killer Ant, you can go to our website (www.blackhearteng.com) and click on "Heart Surgery" for service information, or call 1-800-898-3211 during business hours (7 am to 5 pm PST, Monday-Friday). If you are outside of the U.S., contact your local distributor for technical support and service.

**BLACKHEART ENGINEERING
AMPLIFIER SERIES**

www.blackhearteng.com

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16220 Wood-Red Road NE • Woodinville, WA 98072

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